WHAT IS CLAIMED IS:

1. An apparatus of WRR (Weighted Round-Robin) cell scheduling for ATM (Asynchronous Transfer Mode), said apparatus being for servicing connections fairly according to the weight of each virtual connection in an ATM system including a plurality of virtual connections having a weight based on a requirement for service quality, the apparatus comprising:

virtual connection queues for temporarily storing a plurality of cells of each virtual connection having a weight given by a natural number N;

a plurality of scheduling weight queues having a weight given by a power of 2;

a scheduling weight queue controller for controlling the virtual connection queue to select one of the scheduling weight queues having a weight given by a power of 2 and register the virtual connection queue in the selected scheduling weight queues; and

a queue selector for selecting the scheduling weight queues in the order of high to low weight.

2. The apparatus as claimed in claim 1, further comprising:

a mask bitmap including a plurality of mask bits assigned to the individual scheduling weight queues, whereby the queue selector does not reselect the scheduling weight queue previously selected by as many as its weight; and

a scheduling counter for updating the mask bitmap.

3. The apparatus as claimed in claim 2, wherein the values of the mask bitmap are all cleared during initialization of the system or the scheduling counter, and

when the value of the scheduling counter increases from $2^i -1$ to 2^i, a mask bit corresponding to the scheduling weight queue having a weight of 2^{i-1} is set to 1.

4. The apparatus as claimed in claim 2, wherein the scheduling counter is initialized to "1" during the initialization of the system,

the scheduling counter performing a counting operation when there is no non-empty scheduling weight queue having a highest weight with the mask bit not being set to "1", and

the scheduling counter being reinitialized when the queue selector cannot find any scheduling weight queue to be selected and when the scheduling weight queues with the mask bit cleared are all empty.

5. The apparatus as claimed in claim 1, wherein the scheduling weight queue stores information of the virtual connection queue.

6. The apparatus as claimed in claim 1, wherein the queue selector selects a scheduling weight queue that is not empty and that has the mask bit cleared and that has a weight being the highest one of the weights, if any, that is lower than the weight of the previously selected scheduling weight queue.

7. The apparatus as claimed in claim 1, wherein the scheduling weight queue controller registers the virtual connection queue in the scheduling weight queue, when the virtual connection queue has a new input cell, or when the virtual connection queue still has a cell to be serviced after one cell is serviced by selection of the scheduling weight queue including the corresponding virtual connection queue.

8. The apparatus as claimed in claim 7, wherein when the weight N of the corresponding virtual connection queue is expressed as a series of addition of powers of 2, the scheduling weight queue controller registers the virtual connection queue in a scheduling weight queue having a weight equal to one term in the series of the virtual connection queue and the highest but lower than the weight of a scheduling weight queue currently selected by the queue selector,

and if these conditions are not satisfied, the scheduling weight queue controller registers the virtual connection queue in a scheduling weight queue having a weight corresponding to the highest term among the powers of 2 expressing the weight of the corresponding virtual connection queue.

9. A method of WRR cell scheduling for ATM, comprising:

(a) temporarily storing a plurality of virtual connection cells in a virtual connection queue having a weight for being serviced;

(b) separating the weight of the virtual connection queue in the form of additions of powers of 2;

(c) registering the corresponding virtual connection in a plurality of scheduling weight queues having the weight corresponding to the individual terms of a power of 2; and

(d) selecting the scheduling weight queues having virtual connection to be serviced, in the order of high to low weight, thereby servicing the virtual connection of the corresponding scheduling weight queue.

10. The method as claimed in claim 9, further comprising:

after sequentially servicing the scheduling weight queues in the order of high-to-low weight in (d),

determining whether the scheduling weight queue has a virtual connection to be serviced, in the order of high to low weight, and then selecting a scheduling weight queue having a virtual connection to be serviced.

11. The method as claimed in claim 10, further comprising:

forbidding to select the scheduling weight queues previously selected by as many as the weight of the scheduling weight queue, when the scheduling weight queues are selected.

12. The method as claimed in claim 11, further comprising:

rehabilitating all scheduling weight queues, when there is no scheduling weight queue which is not forbidden.